

(No Model.)

J. CLIFFORD.

BALL COCK.

No. 359,059.

Patented Mar. 8, 1887.

FIG. 1.

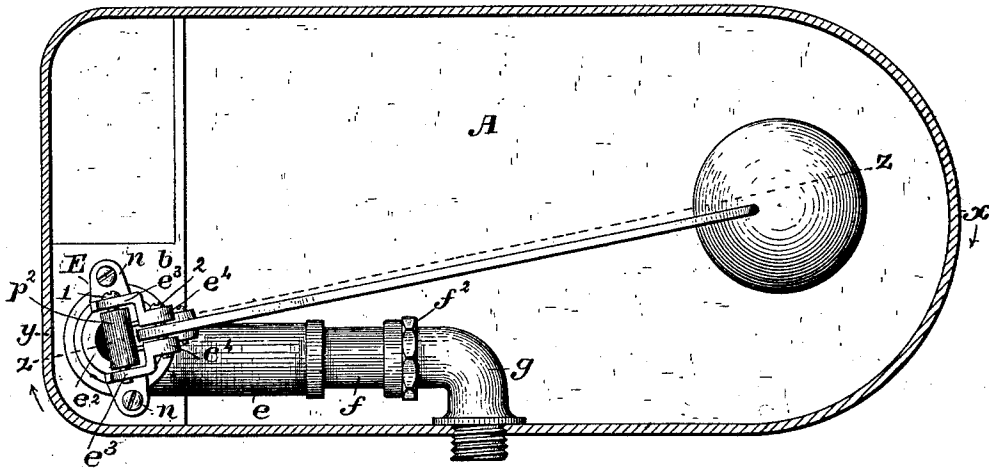


FIG. 2.

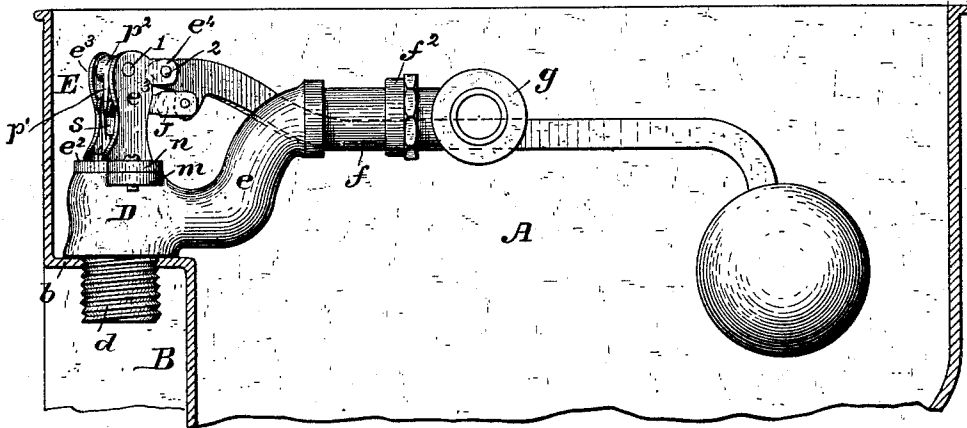


FIG. 3.

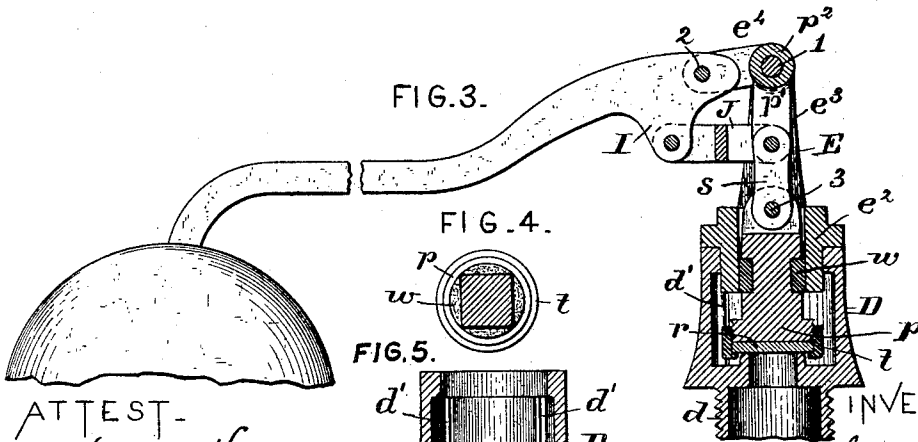
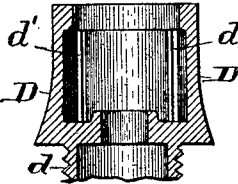


FIG. 4.



FIG. 5.



ATTEST.  
*J. Henry Kaiser.*  
*Henry L. Amer.*

INVENTOR.  
*John Clifford*  
 By *J. N. McIntire*  
 Attorney.

# UNITED STATES PATENT OFFICE.

JOHN CLIFFORD, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE L. WOLFF  
MANUFACTURING COMPANY, OF SAME PLACE.

## BALL-COCK.

SPECIFICATION forming part of Letters Patent No. 359,059, dated March 8, 1887.

Application filed August 14, 1886. Serial No. 210,909. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN CLIFFORD, of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Ball-Cocks; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this application.

My invention relates to certain new and useful improvements in that kind of valvular contrivances commonly known as "ball-cocks," used mostly in water-closet apparatus; and it consists, essentially, in certain novel features of construction, the particulars of which will be found hereinafter more fully explained, and which will be precisely defined in the claims forming part of this specification.

To enable those skilled in the art to which my invention relates to make and use water-closet apparatus containing my alleged improvements, I will now proceed to more fully explain the nature of said improvements, referring by letters of reference to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a top view (with the covering-plate removed) of the trunk or reservoir portion of a side-delivery closet provided with my said improvements. Fig. 2 is a side elevation of the contrivance shown at Fig. 1, but with a portion of the trunk broken away (from the point *x* around to the point *y* at Fig. 1) in order to present to view the interior devices of the reservoir. Fig. 3 is a partial central section taken at the line *z z* of Fig. 1, but drawn on an enlarged scale and designed to better show the details of construction of the valve with its case and the actuating mechanism through the medium of which said valve is opened and closed by the action of the float-lever. Fig. 4 is a detail cross-sectional view of the valve-stem detached from the other parts of the contrivance. Fig. 5 is a partial vertical section of the valve chamber and seat, showing more particularly certain guides formed longitudinally within the valve-cham-

ber, for the purpose of holding the valve laterally during its reciprocatory movements.

In the several figures the same parts will be found designated by the same letters of reference.

A is the trunk or reservoir of a side-delivery closet, such as I have elected to show my improved ball-cock applied to. Said trunk or reservoir A is cast, as shown, with an external recess, B, at one of its corners, within which is supposed to be located the pipe through which water is supplied to the closet, and the upper portion, *b*, of which recess B forms a convenient seat for the base of the ball-cock or valve case D, (as best seen at Fig. 2,) to the screw coupling or extension *d* of which is supposed to be coupled the end of the supply-pipe. This valve-case D is formed with a laterally-projecting ogee extension, *e*, which, by means of the short pipe-section *f* and coupling-union *f*<sup>2</sup>, is connected to the elbow pipe or tube *g*, which latter passes in a well-known manner through the side of the trunk or case A, and which is supposed to be coupled in the usual manner to the flushing-rim of the bowl or basin of the closet. The said valve-case D is formed at or near its open upper end with integral coupling lugs or ears *m*, for the purpose of aiding in holding down on top of said valve-case a metallic stand and valve-stem holder, E, that is formed, as shown, with lugs or ears *n*, through which are passed screws or bolts, which engage with the said lugs *m* of the valve-case. This device E is formed, as shown, with a cylindrical body portion, *e*<sup>2</sup>, the lower part of which enters and fits within the cylindrical upper open end of the valve-case D, and said device E also has vertically-projecting parallel arms *e*<sup>3</sup>, which are perforated near their ends for the accommodation of the bolt or screw 1, and that have laterally-projecting parallel ears *e*<sup>4</sup>, which are also perforated for the accommodation of the pivotal screw or bolt 2, the said bolts 1 and 2 serving, respectively, to secure in place certain parts which will be presently described.

Within the valve-case D is formed the proper

and usual seat, against which may be forced the properly-packed end of the valve *p*, and running longitudinally of its interior are a series of parallel guides, *d'*, against which bears and works the periphery of the valve-head, and by which said valve is kept centered or forced to move in a given right line, and hence to be always properly seated. This valve is provided, as shown, with a rubber or other suitable disk, *r*, which disk or packing is securely held in place by a screw-ring or capping, *t*, that is screwed onto the threaded solid head of the valve, and which has an inwardly-projecting annular flange at one end that overlaps and clamps in place the disk *r*, all as clearly illustrated. The stem of the valve passes through, and of course works back and forth within, the cylindrical portion *e*<sup>2</sup> of the device E, and said stem is purposely made polygonal (either square or triangular) in cross-section, and is provided with a felt packing-ring, *w*, which fits and works closely within the said cylindrical part *e*<sup>2</sup>, all in a manner and for a purpose to be presently more fully explained.

The upper end of the valve-stem is bifurcated, and has pivoted within its forked portion by a screw, 3, the lower end of a link, *s*, the upper end of which link is pivoted, as shown, to the pendent arm *p'*, and also to one end of the pull bar or link J. The pendent arm *p'* projects downwardly from a rock-shaft or stand, *p*<sup>2</sup>, that is mounted to turn freely on the screw or pivot 1, hereinbefore mentioned, and the pull-bar or link J has its other end pivoted to a projecting portion, I, of the float-lever that is fulcrumed on the screw or pivot 2, before alluded to.

It will be observed that the arrangement of the parts just above alluded to is such that the pivotal screw 1 has its axis in the same plane in which lies the axis of the valve-stem, and such that the links *s* and pendent arm *p'* form a perfect toggle-joint system of leverage for actuating the valve-stem, said toggle-joint being pulled into line to force the valve-stem down (and the valve onto its seat in the valve-case) by the pulling action of the link or pull-bar J, actuated in the proper manner to do this by the float-lever whenever the float of said lever may be raised by the water in the tank. This toggle-joint system of leverage acts with an almost infinite degree of power just at the proper time (when its links are pulled almost into line) to effectually close the valve and securely hold it on its seat; but this broad and novel feature of the construction shown is made the subject of another case by me, now pending, and need not be further explained in this application. In the use of the toggle-joint device, however, in connection with the other parts of the ball-cock made and arranged as usual previous to my present invention, serious difficulty has been encountered in practice on account of the liability of the valve-stem to bind and work too hard, especially

after corrosion of the metallic parts from the action thereon of the water. To alleviate or remedy this defect I have in the first place arranged the valve to stand in a vertical position, so that the laterally-crowding effect on the valve-stem by the peculiar tendency of the toggle-joint is partially overcome, and in the next place I have provided the interior of the valve-case with several guides, between which the valve is forced to slide with a perfectly rectilinear movement. In this manner, or by these means, I have practically overcome the difficulty alluded to. To furthermore improve or perfect the action of the valve-stem within its casing, I have provided it with the packing-ring shown and described, made preferably of felt, and which serves not only to prevent contact of the metallic parts, but also to prevent water from passing through and around the stem.

The prevention of any flow of water around the stem is important, because, in addition to the corrosion of the metal parts before alluded to, it very frequently occurs that the water passing through the stem-casing will leave a deposit of lime and other hard foreign substances on the metallic surfaces, which deposit of course decreases the size of the receptacle within which the stem has to slide, and increases the size of said stem, so as to obstruct the free motion of these parts relatively. To still further overcome the possible difficulty arising on account of this deposit of hard matters on the metallic surfaces of the working parts, it is preferable to make the valve-stem polygonal in cross-section, as shown, (either square or triangular,) so that there are presented only three or four edges of metal (at the exterior of the valve-stem) that can receive any deposit or coating, which mere edges cannot of course when coated over offer the same amount of obstruction or impediment as would a cylindrical surface coated all over and working with the similarly-shaped housing or case.

Having now so fully shown and described the respectively novel points of construction as to enable those skilled in the art to practice my invention, either in whole or in part, in either the precise form of contrivance shown or in some form substantially the same, what I claim as new, and desire to secure by Letters Patent, is—

1. In a ball-cock contrivance, the following combination of devices, arranged and operating together in the manner specified, for the purpose hereinbefore set forth: first, the valve-case D, formed or provided with the usual valve-seat and cylindrical housing for the stem of the valve; second, a simple compression-valve having its stem arranged within said casing and its head adapted to be closed against the valve-seat; third, a toggle-joint mechanism or contrivance for actuating the valve-stem through the medium of the usual float-lever; fourth, guides *d'*, operating to confine or guide the head of the valve during its move-

ments, and thus prevent any frictional cramping of the stem of the valve in the housing and casing within which it slides, as hereinbefore set forth.

5 2. In combination with the polygonally-shaped valve-stem and the cylindrical casing or housing within which said valve-stem works, a felt packing ring or collar, *w*, the whole arranged and operating together in sub-

stantially the manner specified, for the purposes set forth.

In witness whereof I have hereunto set my hand this 23d day of July, 1886.

JNO. CLIFFORD.

In presence of—  
ELISHA M. FORD,  
M. S. JAMES.